

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2004/004191

International filing date (day/month/year)
25.03.2004

Priority date (day/month/year)
28.03.2003

International Patent Classification (IPC) or both national classification and IPC
G01R29/24

Applicant
CANON KABUSHIKI KAISHA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/004191

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/004191

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-5
	No: Claims	6
Inventive step (IS)	Yes: Claims	
	No: Claims	1-6
Industrial applicability (IA)	Yes: Claims	1-6
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1) Reference is made to the following documents:

D1: US-A-4 205 267

D2: US-A-5 212 451 (cited in the application)

D3: US-A-4 835 461

2) The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 6** is not new in the sense of Article 33(2) PCT.

2.1) The document **D1** discloses (the references in parentheses applying to this document):

- An electric potential measuring method (column 1 lines 8-10)

Comprising the steps of:

- placing an oscillating body having an electrode which oscillates about a shaft and an electric potential measuring object such that the electrode faces the electric potential measuring object (figures 1, 10-12; column 2 lines 63-66 and column 12 lines 57-60)

- measuring a surface electric potential of the electric potential measuring object based on a capacitance between the electric potential measuring object and the electrode by oscillating the oscillating body (column 2 line 68-column 3 line 5 and column 12 line 60-column 13 line 6)

3) The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 1** does not involve an inventive step in the sense of Article 33(3) PCT.

3.1) The document **D1** is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):

- An electric potential measuring device (figures 10-12 and column 1 lines 8-10)

comprising:

- an oscillating device which includes an oscillating body axially supported such that the oscillating body oscillates (280, 284, 286 in figures 10-12 and column 12 lines 34-36)
- signal detecting means which is located on a surface of the oscillating body and includes at least one detection electrode (288, 290 in figures 10-12 and column 12 lines 37-40)
- wherein an output signal appearing on the detection electrode is detected by varying a distance between the detection electrode and a surface of an electric potential measuring object disposed facing the detection electrode by the oscillating device to vary a capacitance between the detection electrode and the surface of the electric potential measuring object (column 12 line 57-column 13 line 6)

The subject-matter of claim 1 therefore differs from this known electric potential measuring device in that:

The oscillating body is supported by torsion springs instead of showing the cantilever type structure of **D1**.

The problem to be solved by the present invention may therefore be regarded as to optimise the structure of the oscillating body and its support to reduce the size of the potential measuring device.

The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

The feature, of axially supporting the oscillating body by torsion springs, has already been employed for the same purpose in a similar electric potential measuring device (see **D2**: figures 2A, 3B; column 3 lines 37-40 and column 4 lines 42-50). It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply this feature with corresponding effect to a electric potential measuring device according to document **D1**, thereby arriving at an electric potential measuring device according to claim 1.

3.2) The use of micro mechanical structures, as oscillating body and its support, as

suggested in the description of the application on page 22 can also not be considered as involving an inventive step as it is a general practice to implement electric potential measuring devices as micro mechanical structures (see e.g. **D3**: figures 3, 4; column 2 lines 57-66 and column 4 line 64-column 5 line 49)

- 4) Dependent claims 2-5 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:
- 4.1) The additional feature, concerning the use of two detection electrodes and the output signals containing information of different phases and amplitudes, as claimed in **claim 2** is known from **D1**: (see figures 10-12 and column 12 line 57-column 13 line 6).
The further additional feature, concerning the oscillation of the oscillating body about a central axis, can not be considered involving an inventive step as explained under 3.1, Article 33(3).
- 4.2) The additional feature, concerning the use of a difference between the two output signals, as claimed in **claim 3** is known from **D1**: (see column 10 lines 5-11), Article 33(3).
- 4.3) The additional feature, concerning the type of surface of the oscillating body, as claimed in **claim 4** is known from **D1**: (see e.g. the planar oscillating body in figures 10-12), Article 33(3).
- 4.4) The additional feature, concerning the image forming means, as claimed in **claim 5** can not be considered involving an inventive step as electric potential measuring devices are normally used in image forming apparatuses (see e.g. **D2**: column 1 lines 22-29 or **D3**: Figure 6 and column 1 lines 11-13), Article 33(3).

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference CFO17987WO	FOR FURTHER ACTION		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/JP2004/004191	International filing date (<i>day/month/year</i>) 25/03/2004	(Earliest) Priority Date (<i>day/month/year</i>) 28/03/2003	
Applicant CANON KABUSHIKI KAISHA			

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box II).

3. ☐ **Unity of invention is lacking** (see Box III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regards to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

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Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

To provide an electric potential measuring device which is useful in realizing size reduction, high sensitivity, and high reliability. The electric potential measuring device includes: an oscillating device (104) which includes torsion springs (103,102), and an oscillating body axially supported by the springs to oscillate; and signal detecting unit (111,112) which is located on a surface of the oscillating body. A capacitance between the detection electrode and a surface of an electric potential measuring object is varied by varying a distance therebetween by the oscillating device, whereby an output signal appearing on the detection electrode is detected.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP2004/004191

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01R29/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 205 267 A (WILLIAMS BRUCE T) 27 May 1980 (1980-05-27) figures 10-12 column 1, line 8 - line 19 column 6, line 11 - line 15 column 12, line 16 - column 13, line 14	6
Y	-----	1-5
Y	US 5 212 451 A (WERNER JR ALAN J) 18 May 1993 (1993-05-18) cited in the application figures 2A, 3B column 1, line 7 - line 29 column 3, line 36 - line 40 column 4, line 42 - line 63 column 6, line 47 - line 49 ----- -/--	1-5

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

2 July 2004

Date of mailing of the international search report

08/07/2004

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP2004/004191

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 34 10 527 A (LEYBOLD HERAEUS GMBH & CO KG) 4 October 1984 (1984-10-04) abstract figures 1-4 page 6, paragraph 2 – page 7, paragraph 2 -----	1-4,6
A	US 2003/042907 A1 (UEHARA TOSHIO ET AL) 6 March 2003 (2003-03-06) figures 5-9 paragraph '0001! – paragraph '0009! paragraph '0022! paragraph '0036! paragraph '0050! -----	1,4-6
A	EP 1 234 799 A (CANON KK) 28 August 2002 (2002-08-28) abstract figures 1-3,5,10,11A,12,17A,18,19A,24A,26,27A,30A -----	1,2
A	US 4 835 461 A (SNELLING CHRISTOPHER) 30 May 1989 (1989-05-30) figures 3,4 column 1, line 5 – line 13 column 2, line 43 – line 66 column 4, line 64 – column 5, line 49 -----	6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/JP2004/004191

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4205267	A	27-05-1980	NONE	
US 5212451	A	18-05-1993	DE 69325835 D1 DE 69325835 T2 EP 0560513 A2 JP 6003396 A	09-09-1999 17-02-2000 15-09-1993 11-01-1994
DE 3410527	A	04-10-1984	DE 3410527 A1	04-10-1984
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EP 1234799	A	28-08-2002	JP 2002321197 A JP 2002321196 A JP 2002321198 A EP 1234799 A2 JP 2002323669 A US 2002114053 A1	05-11-2002 05-11-2002 05-11-2002 28-08-2002 08-11-2002 22-08-2002
US 4835461	A	30-05-1989	DE 3509710 A1 GB 2157838 A ,B JP 1858621 C JP 5060060 B JP 60231175 A	31-10-1985 30-10-1985 27-07-1994 01-09-1993 16-11-1985